



Salinity

Taking a drink of water from your tap may not show it, but one of the biggest issues facing the Colorado River is its salinity or “saltiness.” Our perceptions of the purity of the waters of the Colorado River must be tempered by the fact that vast deposits of salts are spread throughout Colorado and tons of these dissolved salts are carried down Colorado waterways every day.

The salts dissolved in Colorado’s river waters are not just of the variety we know as common table salt, or sodium chloride. Other types of salt compounds found naturally in our region include magnesium chloride, potassium chloride, sodium bicarbonate (baking soda), magnesium sulfate (Epsom salts), calcium carbonate and calcium sulfate (gypsum).

Salts were deposited in the soils of Colorado and other western states by the receding waters of the Western Inland Sea, a shallow waterway that stretched from the Gulf of Mexico up to the Arctic Ocean from 64 to 144 million years ago. When the present day Rocky Mountains began to rise up 40 to 75 million years ago, the emerging mountains drained away the inland sea water leaving behind large deposits of salts.

Today, the U.S. Geological Survey estimates that half of the salinity in the Colorado River comes from natural sources, such as runoff leaching out deposits of salt from salt-laden marine soils and hot springs that bring dissolved salts to the surface. The other half of the salinity picture is influenced by human activities such as diverting water out of streams for human uses and irrigation of salt-laden soils.

Salts are easily dissolved into water, changing its chemistry. The saltier water becomes, the less fit it is for human consumption and the more it harms plant and animal life. The concentration of salt in river water is measured in parts per million (ppm) or milligrams per liter, both of which are equivalent measures. The more salt there is in water, the higher the number of parts per million.

A quick numbers game illustrates the shape of the Colorado River:

- 50 parts per million – the concentration of salts found in very pure water sources.
- 200 parts per million – salt level found in upstream reservoirs such as Dillon or Ruedi.
- 500 parts per million – target for maximum salinity of drinking water.
- 400-850+ parts per million – salt load found in Colorado River near state line.
- 700-850 parts per million - U.S. Dept of Agriculture estimate on salinity levels that begin to harm crops.

- 577 – 896+ parts per million – salinity of Colorado River water reaching California.
- 3,000 parts per million – salinity of water leaving Welton-Mohawk Irrigation District in Arizona and flowing into the Cienega de Santa Clara in Mexico.
- 35,000 parts per million – salinity of the oceans.
- 44,000 parts per million - salinity of the Salton Sea in California – a below sea-level lake in Southern California formed by historical Colorado River flooding that today only receives runoff from land irrigated by Colorado River water.
- 9 million tons – the amount of salt that is annually carried down the Colorado River from the Upper Basin states of Colorado, Wyoming, Utah and New Mexico to the Lower Basin states of California, Nevada and Arizona.
- \$200 million – Annual economic damage to Lower Basin states caused by moderate levels salinity in Colorado River water.

Colorado faces a growing challenge because of salinity. Besides the Colorado River, the Arkansas River also faces salinity problems. When clean water from headwaters areas is intensively used or diverted out of the basin, salinity concentrations increase in the downstream river stretches. As Colorado River water becomes saltier, the cost of de-salting water for human consumption increases, plumbing infrastructure suffers more damage from harsh salts and plants and animals find it more difficult to survive.